

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A process for casting a metal artefact by charging a die or mould with molten metal and causing or allowing the metal to solidify in the die or mould to form the artefact, the process including the step, prior to charging the die or mould with the molten metal, of heating the die or mould by induction heating to an elevated temperature, the charging taking place with the die or mould at the elevated temperature,

the process [being characterized in that,] including the steps whereby, in combination, the induction heating is employed to provide the surface of the interior of the die or mould with a desired temperature profile whereby the interior surface of the die or mould has different parts or zones at different temperatures from each other or one another, in contact with the molten metal charged into the die or mould, thereby to promote desired cooling and solidification rates in different parts of the metal charged into the die or mould[[;]] and the charging of the die or mould is from a melting apparatus having a capacity to produce a full charge of molten metal which is matched in volume with the capacity or volume of the die or mould, the charging of the die or mould being with sufficient molten metal to produce a single artefact and the charging acting entirely to consume a full molten charge produced by the melting apparatus, the heating arrangement of the melting apparatus being an induction heating arrangement comprising at least one induction coil.

2. (Currently Amended) A process as claimed in Claim 1, [characterized in that it] which includes the step, prior to the charging of the die or mould, of purging the die or mould with a purging gas, the charging taking place under an atmosphere provided by the purging gas.

3. (Currently Amended) A process as claimed in Claim 2, [characterized in that] in which the purging is carried out both prior to and during the heating of the die or mould, the purging being discontinued before the charging takes place.

4. (Currently Amended) A process as claimed in [any one of the preceding claims, characterized in that] Claim 1, in which the charging is carried out under pressure, acting to fill the die or mould to its full capacity.

5. (Currently Amended) A process as claimed in Claim 4, [characterized in that] in which the charging is carried out by injection moulding, at an intermediate pressure in the range 50 KPa -30MPa.

6. (Currently Amended) A process as claimed in [any one of the preceding claims, characterized in that it] Claim 1, which includes using, as the metal, a metal selected from the group consisting of aluminium, magnesium, lithium, zinc and alloys of at least two thereof.

7. (Currently Amended) A process as claimed in Claim 6, [characterized in that it] which includes using, as the metal, a light metal selected from the group consisting of magnesium, aluminium and alloys of at least two thereof.

8. (Currently Amended) A process as claimed in [[any]] Claim 7, ~~[characterized in that]~~ in which the casting is of a light metal artefact in the form of a motor vehicle wheel rim.

9. (Currently Amended) A process as claimed in ~~[any one of the preceding claims, characterized in that]~~ Claim 1, in which the casting is of a metal artefact in which the part of the solidified artefact which is furthest from the surface of the artifact is spaced from the closest part of the surface of the artefact by a spacing of 0.75 – 15mm, the artefact having a mass of 0.25 – 30 kg.

10. (Currently Amended) A process as claimed in ~~[any one of the preceding claims, characterized in that]~~ Claim 1, in which the charging of the die or mould is from a melting apparatus which is reciprocably movable relative to the die or mould, the process including reciprocably moving the melting apparatus between a charging position where it is charged with a precursor of the molten charge, and a filling position where the molten charge is transferred from the melting apparatus to the casting assembly.

11. (Currently Amended) A process as claimed in ~~[any one of the preceding claims, characterized in that]~~ Claim 1, in which the casting is carried out in a plurality of dies or moulds, each associated with a single melting apparatus from which it is charged, each melting apparatus being associated with a single die or mould and being electrically heated by induction heating, a common electrical power supply being used to supply electrical power to the dies or moulds for the induction heating thereof, and a common electrical power supply being used to supply electrical power to the melting apparatuses.

12. (Currently Amended) A casting apparatus or installation for casting metal artefacts, the apparatus or installation including a casting assembly [[(10)]] for casting a

metal artefact [[(100)]], the casting assembly [[(10)]] including a die or mould [[(12)]] for casting the artefact [[(100)]] and the assembly [[(10)]] including an induction heating arrangement [[(14)]], the induction heating arrangement including at least one induction coil [[(25, 26, 27, 28, 29, 30)]] surrounding the die or mould [[(12)]] for heating the die or mould [[(12)]] to an elevated temperature prior to the casting of the artefact [[(100)], ~~the apparatus or installation being characterized in that, in combination~~]], the induction heating arrangement including [[(14) includes]] a plurality of at least two said induction coils [[(25, 26, 27, 28, 29, 30)]] which are operable independently of each other or one another to heat the die or mould [[(12)]] to said elevated temperature while providing the surface of the interior of the die or mould with a desired temperature profile[[;]] and the casting apparatus or installation including [includes] a melting apparatus [[(40)]] for forming a molten charge of metal for use in the casting of said metal artefact [[(100)]] in the casting assembly [[(10)]]], the melting apparatus [[(40)]] including a precursor heating arrangement [[(44)]] for heating a precursor of the molten charge to a temperature at which the molten charge is formed from the precursor, the melting apparatus having a capacity to produce a full charge of molten metal having a volume which is matched with the capacity or volume of the die or mould so that the casting of a single artefact in the die or mould entirely consumes a full molten charge produced by the melting apparatus when the melting apparatus is operated at full capacity, the precursor heating arrangement of the melting apparatus being an induction heating arrangement comprising at least one induction coil [[(46)]].

13. (Currently Amended) An apparatus or installation as claimed in Claim 12, [~~characterized in that~~] in which the induction heating arrangement [[(25, 26, 27, 28, 29, 30)]] of the casting assembly [[(10)]] is in the form of a variable-frequency induction heater [[(14)]].

14. (Currently Amended) An apparatus or installation as claimed in Claim 12 [or ~~Claim 13, characterized in that it~~, which includes a purging gas supply line [[(31)]] connected to the die or mould [[(12)]] for supplying a purging gas to the interior of the die or mould [[(12)]].

15. (Currently Amended) An apparatus or installation as claimed in [any one of Claims 12–14 inclusive, characterized in that] Claim 12, in which the die or mould [[(12)]] is a re-usable multi-core [[(16, 18, 22)]] segmented metal die or mould [[(12)]].

16. (Currently Amended) An apparatus or installation as claimed in Claim 15, [~~characterized in that~~] in which the re-usable die or mould [[(12)]] is hydraulically operable and has a bottom- or face core [[(18)]] provided with a metal-charging opening [[(20)]] for charging the die or mould [[(12)]] with molten metal from below.

17. (Currently Amended) An apparatus or installation as claimed in [any one of Claims 12–16 inclusive, characterized in that] Claim 12, in which the melting apparatus is reciprocably movable relative to the casting assembly between a charging position where charging of the melting apparatus with a precursor of the molten charge takes place, and a filling position where transfer of a molten charge from the melting apparatus to the casting assembly takes place.

18. (Currently Amended) An apparatus or installation as claimed in Claim 17, [~~characterized in that it~~] which includes rails [[(67)]], the melting apparatus being mounted via wheels [[(66)]] on the rails, the wheels being rollable along the rails during reciprocating movement of the melting apparatus relative to the casting assembly.

19. (Currently Amended) An apparatus or installation as claimed in [any one of Claims 12—18 inclusive, characterized in that it] Claim 12, which includes a plurality of the casting assemblies and the same plurality of the melting apparatuses, each casting assembly being associated with a single said melting apparatus and each melting apparatus being associated with a single said casting assembly, the casting assemblies sharing a common electrical heating power supply [[(94)]] and the melting apparatuses sharing a common electrical heating power supply [[(92)]].